

REMARKS

In the Office action mailed November 14, 2007, claims 1 and 3-4 were rejected under 35 USC §103 for allegedly being obvious over US 2003/0034095 to Heimann et al. in view of US Patent 5,211,663 to Kovacs et al.

Claims 5-8 were rejected under 35 USC §103 for allegedly being obvious over US 2003/0162077 to Ohtani et al. in view of US Patent 6,440,598 to Fukui et al., and further in view of the '095 document to Heimann et al.

Claim 9 was rejected under 35 USC §103 for allegedly being obvious over the '077 document to Ohtani in view of the '598 patent to Fukui and the '095 document to Heimann, and further in view of US Patent 4,497,667 to Vashi.

Applicant would like to thank the Examiner for the careful consideration given the present application. The application has been carefully reviewed in light of the Office action, and amended as necessary to more clearly and particularly describe the subject matter which applicant regards as the invention.

A. Rejection of Claims 1 and 3-4 Under 35 USC §103 Based on US 2003/0034095 to Heimann in View of US Patent 5,211,663 to Kovacs Must be Withdrawn

Before turning attention to this rejection, it is instructive to first consider the claimed subject matter relating to the passivation of stainless steel. Passivation generally refers to a process in which a thin, protective coating or layer is formed upon a metal substrate, to thereby protect the metal from corrosion or other reactions. The claims at issue relate to methods of passivating a stainless steel surface. As will be appreciated, there exist numerous strategies and techniques for

passivating a stainless steel surface. The background section of the present application describes various approaches that artisans have previously attempted.

The present invention methods are based upon the formation of a thin, metal-hydroxide layer on the outer surface of the stainless steel substrate. This thin layer protects the metal surface underneath, and thereby prevents or at least reduces the potential for corrosion. This particular passivation layer, is described throughout the application as a metal hydroxide layer, see page 6, lines 5-15; and page 12, line 3 to page 13, line 17.

In contrast, the '095 document to Heimann, describes to a process for forming a specific type of mineral layer upon a metal surface:

[0016] The instant invention relates to a process for depositing or forming a beneficial surface (e.g. a mineral containing coating or film) upon a metallic surface...By "mineral containing coating"...or "mineral" it is meant to refer to a relatively thin coating or film which is formed upon a metal surface wherein at least a portion of the coating or film comprises at least one metal containing mineral, e.g. an amorphous phase or matrix surrounding or incorporating crystals comprising a zinc disilicate.

This mineral layer, particularly one containing a zinc disilicate, is readily distinguishable from the metal hydroxide layers that result from the methods of the claims at issue.

Furthermore, this mineral layer is deposited from an immersion medium containing a water soluble compound, see paragraphs [0002] and [0007] of the '095 document. In the examples given in the '095 document, these water soluble compounds are rather exotic compounds and are noted as sodium stannate trihydrate, sodium molybdate dehydrate, ammonium metavanadate, and cerium nitrate hexahydrate.

Thus, the chemistry and resulting mineral layer formed upon the metal

substrate taught by Heimann, is significantly different than the metal hydroxide layer formed upon the stainless steel substrate as recited in the claims at issue.

Moreover, if one followed the teachings of the '095 document to Heimann, one would be motivated to add one or more of these exotic compounds to an immersion bath, in order to form the noted mineral layers on a metal substrate. This strategy is entirely different than the methods called for in the claims at issue. "A *prima facie* case of obviousness can be rebutted if the applicant... can show 'that the art in any material respect taught away' from the claimed invention," *In re Haruna*, 249 F.3d 1327, 58 USPQ2d 1517 (Fed Cir 2001), citing *In re Geisler*, 116 F.3d 1465, 1469, 43 USPQ2d 1362, 1365 (Fed Cir. 1997).

In order to further distinguish the claimed subject matter, claim 1 has been amended to recite that the hydroxides $M(OH)_n$ that are formed (which constitute the passive film) are produced from metal ions (M^+) constituting the stainless steel and hydroxide ions (OH^-). No new matter is added by this clarification since support is found throughout the present application as filed, and particularly at page 12, line 24 to page 13, line 5.

The '663 patent to Kovacs fails to remedy the deficiencies of the '095 document to Heimann. Kovacs describes a method of passivating surfaces of stainless steel implants. The methods taught by Kovacs use the salts of water soluble metals in combination with "non-aggressive oxyanions" (oxyanions are polyatomic ions containing oxygen) which are said to be sulfate, phosphate, di-hydrogen phosphate, mono-hydrogen phosphate, borate and the like, see col 4., lines 2-4; and col 5, lines 39-41. The methods of the claims at issue do not require the use of the noted oxyanions.

Furthermore, it is not appropriate to combine the teachings of Heimann with Kovacs. In the event such references were somehow combined, one would be left with a collective teaching of attempting to deposit mineral layers from a solution containing one or more exotic salts in conjunction with the use of "non-aggressive oxyanions." It is unknown whether a mineral layer could even be deposited from this mixture. This combined teaching would in no way, teach, describe or even suggest the particular methods recited in the claims at issue. "If when combined, the references 'would produce a seemingly inoperative device,' then they teach away from their combination." *Tec Air, Inc. v. Denso Manufacturing Michigan, Inc.*, 192 F.3d 1353, 52 USPQ2d 1294 (Fed Cir. 1999) citing *In re Sponnable*, 405 F.2d 578, 587, 160 USPQ 237, 244 (CCPA 1969). And, in the event that the mineral layer could be successfully deposited, as previously explained, such a mineral layer is distinguishable from the layers resulting from the methods of the pending claims.

For at least these reasons, it is submitted that independent claim 1 is patentable over the limited teachings of the '095 document to Heimann and the '663 patent to Kovacs. Since claim 1 is patentable over the cited art, so too are claims 3 and 4 dependent therefrom.

B. Rejection of Claims 5-8 Under 35 USC §103 Based on US 2003/0162077 to Ohtani in View of US Patent 6,440,598 to Fukui, and Further in View of the '095 Document to Heimann Must be Withdrawn

Independent claim 5 recites a method for manufacturing a stainless steel separator for use in a fuel cell. The method comprises applying a lubricant to a stainless steel thin sheet and press-forming gas flow passages and cooling water flow passages in the sheet. Lubricant adhered to the stainless steel thin sheet is

removed by spraying the sheet with an alkaline solution for cleaning. The alkaline solution is removed from the stainless steel thin sheet by spraying washing water onto the sheet. Wash water is removed by spraying ion-exchange water onto the stainless steel thin sheet. An alkaline solution for passivation treatment is sprayed onto the stainless steel thin sheet to passivation-treat the sheet. The alkaline solution for passivation treatment that is adhered to the stainless steel thin sheet is removed by spraying ion-exchange water onto the stainless steel thin sheet. The stainless steel thin sheet is then dried.

The '077 document to Ohtani, although describing a method of manufacturing and passivating a fuel cell metallic separator; fails to teach, describe, or even suggest the particular method recited in claim 5. Instead, Ohtani describes using a grinding process in which a pressed metal blank is exposed to wet abrasive blasting.

Specifically, Ohtani fails to describe, teach, or even suggest the many features in claim 5 such as "a step of applying a lubricant to a stainless steel thin sheet and press-forming gas flow passages and cooling water flow passages in it." Ohtani also fails to describe, teach, or suggest "a step of removing lubricant adhered to the stainless steel thin sheet by spraying the press-formed stainless steel thin sheet with an alkaline solution for cleaning." Ohtani also fails to describe, teach, or suggest "a step of removing alkaline solution for cleaning adhered to the stainless steel thin sheet by spraying washing water onto the stainless steel thin sheet." Ohtani also fails to describe, teach, or suggest "a step of removing washing water remaining on the stainless steel thin sheet by spraying ion-exchange water onto the stainless steel thin sheet."

Regarding passivation, although Ohtani describes performing such an

operation, Ohtani actually employs an entirely different passivation procedure than that recited in the claims at issue. Instead of using an "alkaline solution" as called for in the pending claims, Ohtani uses nitric (or nitride) acid, see paragraphs [0078] and [0092] of the '077 document. The problems of using nitric acid for passivation are described in the background section of the present application. The present invention provides a superior alternative to such known passivation methods.

Thus, Ohtani fails to describe, teach, or suggest "a step of spraying an alkaline solution for passivation treatment onto the stainless steel thin sheet to passivation-treat the stainless steel thin sheet." And thus, it follows that Ohtani also fails to describe, teach, or suggest "a step of removing alkaline solution for passivation treatment adhered to the stainless steel thin sheet by spraying ion-exchange water onto the stainless steel thin sheet."

The '598 patent to Fukui fails to remedy the deficiencies of the '077 publication to Ohtani. Fukui fails to mention anything about passivating stainless steel surfaces. Instead, Fukui describes a separator for a fuel cell comprising a stainless steel substrate that has a collection of carbonaceous particles adhered to it in a certain distribution.

The '095 document to Heimann, as will be recalled, is not particularly relevant. Heimann describes depositing mineral layers as passivating layers. As previously explained, that is readily distinguishable from the pending claims. And, Heimann entirely fails to remedy the deficiencies of Ohtani and/or Fukui.

For at least these reasons, it will be appreciated that Ohtani in view of Fukui, and further in view of Heimann, are simply not relevant to the method recited in independent claim 5. Since independent claim 5 is believed to be patentable over

the cited art, so too are claims 6-8, dependent therefrom.

C. Rejection of Claim 9 Under 35 USC §103 Based on the '077 document to Ohtani in View of the '598 Patent to Fukui and the '095 Document to Heimann, and Further in View of US Patent 4,497,667 to Vashi Must be Withdrawn

Claim 9 recites in part, that the alkaline solution for cleaning is a solution made by adding a surfactant to a basic salt. However, claim 9 is dependent from previously discussed independent claim 5. And since claim 5 is distinguishable over the cited references to Ohtani, Fukui, and Heimann, then the inquiry becomes whether the '667 patent to Vashi remedies the deficiencies of those references.

The '667 patent to Vashi is directed to a complex mixture of numerous components that forms a cleaning and conditioning solution. The purpose of Vashi's cleaning and conditioning solutions are actually opposite that of the present invention passivating solutions. Instead of forming a protective passivating layer on a metal substrate, as in claim 9 at issue, Vashi teaches that a cleaning and conditioning operation can be performed by applying the noted complex solution. "Conditioning," according to Vashi, refers to activating a surface and grain refining, see col. 1, lines 31-33. These operations are very different than forming a thin protective layer on a surface to prevent the surface from reacting or otherwise undergoing corrosion.

Thus, Vashi teaches away from claim 9. And clearly, Vashi does not remedy the deficiencies of the remaining references. "A prima facie case of obviousness can be rebutted if the applicant... can show 'that the art in any material respect taught away' from the claimed invention," *In re Haruna*, 249 F.3d 1327, 58 USPQ2d 1517

(Fed Cir 2001), citing *In re Geisler*, 116 F.3d 1465, 1469, 43 USPQ2d 1362, 1365 (Fed Cir. 1997).

Accordingly, it is believed that none of the references taken singularly, or in any combination, teaches the subject matter of claim 9. Accordingly, it is submitted that claim 9 is patentable over the cited art.

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 18-0160, our Order No. SHM-15962.

Respectfully submitted,

RANKIN, HILL, PORTER & CLARK LLP

By /Mark E. Bandy/
Mark E. Bandy, Reg. No. 35788

38210 Glenn Avenue
Willoughby, Ohio 44094-7808
(216) 566-9700